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Backside Absorbing Layer Microscopy (BALM): a new tool to study nanomaterials and their electrochemical properties

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Backside Absorbing Layer Microscopy (BALM) is a new optical microscopy technique, which uses absorbing anti-reflection layers to achieve extreme contrast at an interface.

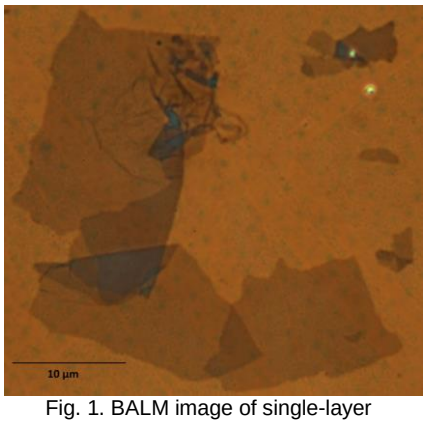


Fig. 1. BALM image of single-layer Graphene Oxide flakes

It combines the vertical *sub*-nm sensitivity of an AFM with the versatility and real-time imaging capabilities of an optical microscope. Recently, we showed how this technique allows observing 2D materials and their chemical modification with unprecedented resolution (1). As an example, Fig. 1 displays single-layer graphene oxide flakes observed with BALM. It notably allows to directly identifying stacks, folds, wrinkles and defects.

The BALM geometry and its capability to image surfaces and nanomaterials in liquid are ideally suited to its coupling with electrochemistry (and other techniques). In this poster, we will specially focus on such coupling and demonstrate its potential to address different classes of problems related to 2D materials and their nanoscale characterization, mostly in the context of sustainable energy applications.

(1) Campidelli, S.; Abou Khachfe, R.; Jaouen, K.; Monteiller, J.; Amra, C.; Zerrad, M.; Cornut, R.; Derycke, V.; Ausserré, D. "Backside Absorbing Layer Microscopy: Watching Graphene Chemistry", *Science Advances* **2017**.